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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/791,410	03/01/2004	Cheng-Kuang Sun	JCLA12158	2573

7590
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EXAMINER

HENN, TIMOTHY J

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2622

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/791,410	Applicant(s) SUN ET AL.	
	Examiner Timothy J. Henn	Art Unit 2622	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 August 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2 and 5-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,5-10 and 13-20 is/are rejected.
- 7) ☒ Claim(s) 11 and 12 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 2, 5-10, 14-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hashimoto (US 2003/0124773) in view of Kobayashi (US 7,180,546).

[claim 1]

Regarding claim 1, Hashimoto discloses a camera module comprising: a lens (Figure 6; Figure 1, Item 54); a holder portion having a lower portion, the holder holding the lens (Figure 6; Figure 1, Item 44); a circuit board (Figure 6; Figure 1, Item 70); and an image sensing and processing unit including an image sensing device (Figure 6, Item 10) and an optional signal processing device (Figure 6, Item 110) stacked on and electrically connected to the image sensing device, the image sensing and processing unit being packaged on one side of the circuit board (Figure 6); wherein the holder is fixed on the circuit board and the image sensing and processing unit is inside the lower portion of the holder (Figure 6). However, Hashimoto does not disclose a circuit board

which is a flexible circuit board and a hard plate disposed on the other side of the flexible circuit board corresponding to the image sensing and processing unit.

Kobayashi discloses a mounting system for an image sensor in a camera module (Figure 4A and 4B). The mounting system of Kobayashi includes a flexible circuit board (Figure 4B, Item 36) to which the imager is connected (Figure 4A, Item 2) and a hard plate disposed on the other side of the flexible circuit board (Figure 4B, Item 29; c. 7, ll. 27-31). Kobayashi further discloses that such a mounting arrangement allows for heat generated by the imager to be radiated without arranging a dedicated radiator resulting in high image quality (c. 11, ll. 6-20). Therefore, it would be obvious to use the mounting system of Kobayashi in the camera module of Hashimoto to radiate heat generated by the imager and to maintain high image quality. It is noted that since Hashimoto discloses mounting an image sensor to a signal processing device and then mounting the signal processing device to the circuit board, it would further be obvious to maintain this relation ship when applying the mounting system of Kobayashi and to mount the combined image sensor/signal processor package to the flexible circuit board described by Kobayashi.

[claim 2]

Regarding claim 2, Hashimoto discloses a glass layer directly covering the image sensing device (Figure 6; Figure 1, Item 32; Paragraph 0063).

[claim 5]

Regarding claim 5, Hashimoto discloses an image sensing device which is a CMOS image sensing device (Paragraph 0059).

[claim 6]

Regarding claim 6, Hashimoto discloses an image processing device for use in a digital camera (Paragraphs 0078-0079), but does not specify that the image processing device is a digital signal processing (DSP) chip. Official Notice is taken that the use of DSP chips in digital cameras is well known in the art to efficiently process images captured by an image pickup device. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include a DSP chip as claimed as the signal processing device to efficiently process the images captured by the digital camera of Hashimoto.

[claim 7]

Regarding claim 7, Hashimoto discloses a signal processing device and image sensing device which are electrically connected together by wire bonding (Paragraph 0077).

[claim 8]

Regarding claim 8, Hashimoto discloses camera module comprising a lens (Figure 6; Figure 1, Item 54); a holder portion having a lower portion, the holder holding the lens (Figure 6; Figure 1, Item 44); an image sensing and processing unit including an image sensing device (Figure 6, Item 10) and an optional signal processing device (Figure 6, Item 110) stacked on and electrically connected to the image sensing device; a plate holding the image sensing and processing unit and covering the bottom of the

holder, the image sensing and processing unit being inside the lower portion of the holder (Figure 6) and a circuit board connected to the image sensing and processing unit (Figure 6; Figure 1, Item 70). However, Hashimoto does not disclose that the circuit board is a flexible circuit board.

Kobayashi discloses a mounting system for an image sensor in a camera module (Figure 4A and 4B). The mounting system of Kobayashi includes a flexible circuit board (Figure 4B, Item 36) to which the imager is connected (Figure 4A, Item 2) and a hard plate disposed on the other side of the flexible circuit board (Figure 4B, Item 29; c. 7, ll. 27-31). Kobayashi further discloses that such a mounting arrangement allows for heat generated by the imager to be radiated without arranging a dedicated radiator resulting in high image quality (c. 11, ll. 6-20). Therefore, it would be obvious to use the mounting system of Kobayashi in the camera module of Hashimoto to radiate heat generated by the imager and to maintain high image quality. It is noted that since Hashimoto discloses mounting an image sensor to a signal processing device and then mounting the signal processing device to the circuit board, it would further be obvious to maintain this relation ship when applying the mounting system of Kobayashi and to mount the combined image sensor/signal processor package to the flexible circuit board described by Kobayashi (i.e. the flexible circuit board is directly connected to the image sensing and processing unit).

[claim 9]

Regarding claim 9, Hashimoto discloses a glass layer directly covering the image sensing device (Figure 6; Figure 1, Item 32; Paragraph 0063).

[claim 10]

Regarding claim 10, Hashimoto discloses a circuit board which is electrically connected to the signal processing device (Figure 6).

[claim 14]

Regarding claim 14, Hashimoto discloses an image sensing device which is a CMOS image sensing device (Paragraph 0059).

[claim 15]

Regarding claim 15, Hashimoto discloses an image processing device for use in a digital camera (Paragraphs 0078-0079), but does not specify that the image processing device is a digital signal processing (DSP) chip. Official Notice is taken that the use of DSP chips in digital cameras is well known in the art to efficiently process images captured by an image pickup device. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include a DSP chip as claimed as the signal processing device to efficiently process the images captured by the digital camera of Hashimoto.

[claim 16]

Regarding claim 16, Hashimoto discloses a signal processing device and image sensing device which are electrically connected together by wire bonding (Paragraph 0077).

[claim 17]

Regarding claim 17, Hashimoto discloses an image sensing and processing unit comprising: a signal processing device (Figure 6, Item 110); an image sensing device stacked on and electrically connected to the signal processing device (Figure 6, Item 10) and a circuit board connected to at least one of the signal processing device and image processing device (Figure 6; Figure 1, Item 70). However, Hashimoto does not disclose that the circuit board is directly connected to the signal processing device.

Kobayashi discloses a mounting system for an image sensor in a camera module (Figure 4A and 4B). The mounting system of Kobayashi includes a flexible circuit board (Figure 4B, Item 36) to which the imager is connected (Figure 4A, Item 2) and a hard plate disposed on the other side of the flexible circuit board (Figure 4B, Item 29; c. 7, ll. 27-31). Kobayashi further discloses that such a mounting arrangement allows for heat generated by the imager to be radiated without arranging a dedicated radiator resulting in high image quality (c. 11, ll. 6-20). Therefore, it would be obvious to use the mounting system of Kobayashi in the camera module of Hashimoto to radiate heat generated by the imager and to maintain high image quality. It is noted that since Hashimoto discloses mounting an image sensor to a signal processing device and then mounting the signal processing device to the circuit board, it would further be obvious to maintain this relation ship when applying the mounting system of Kobayashi and to mount the combined image sensor/signal processor package to the flexible circuit board described by Kobayashi (i.e. the flexible circuit board is directly connected to the signal processing device).

[claim 18]

Regarding claim 18, Kobayashi discloses a flexible circuit board wherein the image sensing device is disposed on the flexible circuit board (Figures 4A and 4B, Item 36).

[claim 19]

Regarding claim 19, Kobayashi discloses a flexible circuit board (Figures 4A and 4B, Item 36).

[claim 20]

Regarding claim 20, Kobayashi discloses one flexible circuit board (Figures 4A and 4B, Item 36).

4. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hashimoto (US 2003/0124773) in view of Kobayashi (US 7,180,546) in view of Yamazaki et al. (US 2004/0079941).

[claim 13]

Regarding claim 13, Hashimoto in view of Kobayashi discloses a plate which is made out of metal having high thermal conductivity (Figure 4A, Item 29; c. 7, ll. 27-31), but does not disclose a plate which is a plastic plate.

Kobayashi discloses that plastics may be substituted for metals since plastic substrates can achieve thermal conductivities as high as that of metals while being made at a low-cost and are lighter in weight compared to metals (Paragraph 0016).

Therefore, it would be obvious to use a plastic material as taught by Kobayashi in place

of the metal material to form a device which is light-weight and can be made at a lower cost.

Allowable Subject Matter

5. Claims 11 and 12 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

[claims 11 and 12]

Regarding claims 11 and 12, the prior art does not teach or fairly suggest a camera module as claimed wherein a first flexible circuit board is electrically connected to the signal processing device and a second flexible circuit board is connected to the image sensing device. While the use of flexible circuit boards for connecting image processing and image sensing devices is known in the art, the use of a first and second flexible circuit board as claimed is not taught or suggested.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

i. Nezu

US 4,837,407

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Timothy J. Henn whose telephone number is (571)272-7310. The examiner can normally be reached on M-F 11-7.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lin Ye can be reached on (571) 272-7372. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2622

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Timothy J Henn/
Primary Examiner, Art Unit 2622